

REMARKS/ARGUMENTS

Applicants respond herein to the Office Action dated April 19, 2004.

The indication of the allowance of claims 3-5 is noted with appreciation.

Applicants further note the indication of allowability of claims 7-8. It will be observed that the limitations of claim 7 were incorporated in claim 6 and claim 7 was canceled. The remaining dependent claims 8 and 10-14 are presently in allowable form and formal indication thereof is respectfully solicited.

Newly presented claim 15 is modeled after claim 9 and newly presented claims 16 and 17 depend on claim 15.

Claim 15 recites that the diffusion plate diffuses light emitted from the flash lamps and directs that light to the substrate. The diffusion plate is so constructed that the light transmittance of a center part thereof is lower than the light transmittance of a corresponding end part thereof.

Therefore, at the center part where a larger quantity of light is emitted from the flash lamp, the quantity of transmitted light is decreased, whereas, at the end part where a relatively small quantity of light is emitted, the light from the flash lamp is transmitted almost in its entirety. The diffusion plate is so constructed that it achieves an in-plane uniformity of illumination distribution of the flash light that reaches the substrate. This is highly desirable.

Claim 9 which largely corresponds to claim 15 was rejected on grounds of obviousness over Shao et al. (U.S. Patent No. 6,437,290), in view of Arai et al. (U.S. Patent No. 4,571,486). Thus, Shao et al. constitutes the centerpiece on which the rejection of record is based.

Turning to Shao et al., it discloses a light-transmitting window 6 in the form of a substantially flat window, but with a convex lens part 61 at the periphery around the center part for deflecting the light irradiated from halogen lamps 51, to avoid such light from traveling outwardly and away from the substrate and redirect it to the inner side of the substrate (as described at column 11, lines 7-21, column 11, line 50 to column 12, line 25).

As described, the light-transmitting window 6 of Shao et al. has a light transmittance that is constant both at the center part and at the peripheral end parts. Further, even though the

transmitted light is deflected by the convex lens part 61, the light quantity across the substrate remains unchanged.

Applicants respectfully submit that as described above (and indeed in the Office Action), the structure of Shao et al. is significantly different from the claimed diffusion plate of the present invention. Firstly, insofar as the instant claim 15 provides and claims a diffusion plate wherein the light transmittance of a center part is lower than an end part, it recites a structural difference that is nowhere disclosed or suggested in the art of record.

Moreover, where the thermal processing apparatus employs halogen lamps 51 as in Shao et al., the irradiation time period is necessarily well over several seconds. Therefore, even if illumination distribution in the lamp is not uniform, the non-uniformity of the illumination is ordinarily corrected by rotating the substrate as described in Shao et al. at column 11, lines 36-48.

In marked contrast, as described at page 13, line 24-page 14, line 4 of the present specification, the instant invention irradiates with flash light which heats the substrate in an extremely short time period of from 0.1 milliseconds to 10 milliseconds. Therefore, as described at page 2, line 25 to page 3, line 8 of the present specification, it is impossible to compensate for non-uniformity of light and uneven heating by merely rotating the substrate. The only available solution known to applicants is the solution of the instant application wherein a diffusion plate is provided in which the light transmittance of the center part is lower than that of the peripheral part which improves the in-plane uniformity of illumination distribution of the flash light reaching the substrate.

Neither Shao et al. nor the secondary reference Arai et al. discloses a technique for improving the in-plane uniformity of illumination distribution of the flash light reaching the substrate by using a diffusion plate wherein the light transmittance at a center part is lower than light transmittance at the radial periphery and none of these references disclose utilizing such a construction in a thermal processing apparatus using flash lamps. Therefore, neither the individual nor the combined teachings of the cited references lead one to the subject matter specifically claimed in newly presented claim 15 (which is modeled on canceled claim 9). The

remaining claims 16 and 17 depend from claim 15 and include its limitations. Therefore, they too distinguish over the prior art.

Accordingly, the Examiner is respectfully requested to reconsider the application, allow the claims as amended and pass this case to issue.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on July 19, 2004:

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